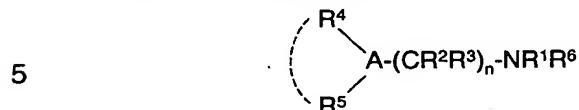


## CLAIMS

1. A catalyst composition comprising:

1) a gelling catalyst represented by the general formula:



in which:

A represents CH or N,

R<sup>1</sup> represents hydrogen or the group  $\begin{array}{c} \text{R}^4 \\ \diagdown \\ \text{---} \text{A} \text{---} (\text{CR}^2\text{R}^3)_n \text{---} \\ \diagup \\ \text{R}^5 \end{array}$ ,

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n represents an integer between 1 and 3, inclusive,

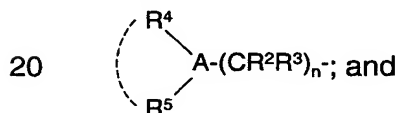
R<sup>2</sup> and R<sup>3</sup> each represent hydrogen or a C1-C6 alkyl group, and

R<sup>6</sup> represents H or 3-aminopropyl, provided that:

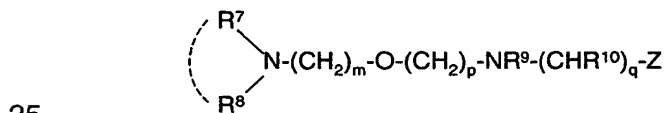
when A is N, R<sup>4</sup> and R<sup>5</sup> each represents a C1-C6 alkyl group or together

15 represent a C2-C5 alkylene group which may contain a ring amine moiety -NR-, where R is hydrogen, a C1-C4 alkyl group, or the group  $\begin{array}{c} \text{R}^4 \\ \diagdown \\ \text{---} \text{A} \text{---} (\text{CR}^2\text{R}^3)_n \text{---} \\ \diagup \\ \text{R}^5 \end{array}$ ; and

when A is CH, R<sup>4</sup> and R<sup>5</sup> together represent a C2-C5 alkylene group containing a ring amine moiety -NR-, where R is a C1-C4 alkyl group or the group



2) a blowing catalyst according to the general formula:

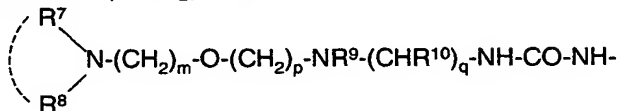


wherein:

R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> each independently represents a C1-C4 alkyl group;

R<sup>10</sup> represents H, a C1-C4 alkyl group, a C6-C20 aryl group, or a C6-C20 aralkyl group;

m, p, and q each independently represents an integer between 1 and 4, inclusive; and Z represents -OH, -NH<sub>2</sub>, -NH-CO-NH<sub>2</sub>, or



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2. The catalyst composition of claim 1, wherein R<sup>4</sup> and R<sup>5</sup> are each a methyl group, A is nitrogen, and R<sup>2</sup> and R<sup>3</sup> are each hydrogen.

10 3. The catalyst composition of claim 1, wherein R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> are each a methyl group, m and p are each equal to 2, and q is either 2 or 3.

4. The catalyst composition of claim 1, wherein A is CH, n is an integer between 1 and 3, inclusive, and R<sup>4</sup> and R<sup>5</sup> together constitute -CH<sub>2</sub>CH<sub>2</sub>N(CH<sub>3</sub>)CH<sub>2</sub>-.

15 5. The catalyst composition of claim 1, wherein the gelling catalyst comprises N,N,N',N''-tetramethyldipropylenetriamine.

6. The catalyst composition of claim 1, wherein the gelling catalyst comprises 3-dimethylaminopropylamine.

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7. The catalyst composition of claim 1, wherein the gelling catalyst comprises N,N-bis(3-dimethylaminopropyl)-1,3-propanediamine.

25 8. The catalyst composition of claim 1, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-2-hydroxyethylbis(aminoethyl) ether.

9. The catalyst composition of claim 8, wherein the gelling catalyst comprises N,N,N',N''-tetramethyldipropylenetriamine.

10. The catalyst composition of claim 8, wherein the gelling catalyst comprises 3-dimethylaminopropylamine.

11. The catalyst composition of claim 8, wherein the gelling catalyst comprises N,N-bis(3-dimethylaminopropyl)-1,3-propanediamine.

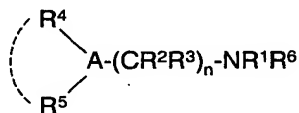
12. The catalyst composition of claim 1, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-3-aminopropylbis(aminoethyl) ether.

13. The catalyst composition of claim 1, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-3-ureidopropylbis(aminoethyl) ether.

14. The catalyst composition of claim 1, further comprising a carboxylic acid that forms a salt with one or both of the gelling catalyst and the blowing catalyst.

15. A formulation for producing a polyurethane foam, the formulation comprising a polyol, a polyisocyanate, water, and a catalyst composition comprising:

1) a gelling catalyst represented by the general formula:



in which:

A represents CH or N,

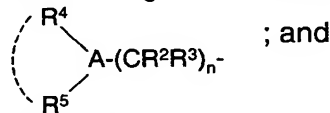
R<sup>1</sup> represents hydrogen or the group  $\begin{array}{c} \text{R}^4 \\ \diagdown \\ \text{A}-(\text{CR}^2\text{R}^3)_n- \\ \diagup \\ \text{R}^5 \end{array}$ ,

n represents an integer between 1 and 3, inclusive,

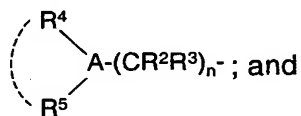
R<sup>2</sup> and R<sup>3</sup> each represent hydrogen or a C1-C6 alkyl group, and

R<sup>6</sup> represents H or 3-aminopropyl, provided that:

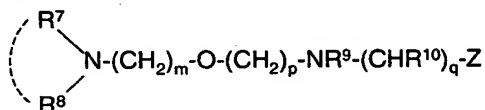
when A is N, R<sup>4</sup> and R<sup>5</sup> each represents a C1-C6 alkyl group or together represent a C2-C5 alkylene group which may contain a ring amine moiety -NR-, where R is hydrogen, a C1-C4 alkyl group, or the group



- 5 when A is CH, R<sup>4</sup> and R<sup>5</sup> together represent a C2-C5 alkylene group containing a ring amine moiety -NR-, where R is a C1-C4 alkyl group or the group



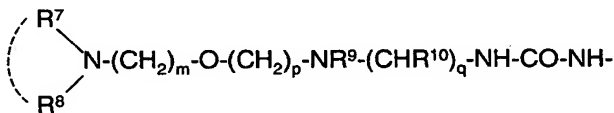
- 10 2) a blowing catalyst according to the general formula:



wherein:

R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> each independently represents a C1-C4 alkyl group;

- 15 R<sup>10</sup> represents H, a C1-C4 alkyl group, a C6-C20 aryl group, or a C6-C20 aralkyl group;  
m, p, and q each independently represents an integer between 1 and 4, inclusive; and Z represents -OH, -NH<sub>2</sub>, -NH-CO-NH<sub>2</sub>, or



20

16. The formulation of claim 15, wherein R<sup>4</sup> and R<sup>5</sup> are each a methyl group, A is nitrogen, and R<sup>2</sup> and R<sup>3</sup> are each hydrogen.

17. The formulation of claim 15, wherein R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> are each a methyl  
25 group, m and p are each equal to 2, and q is either 2 or 3.

18. The formulation of claim 15, wherein A is CH, n is an integer between 1 and 3, inclusive, and R<sup>4</sup> and R<sup>5</sup> together constitute -CH<sub>2</sub>CH<sub>2</sub>N(CH<sub>3</sub>)CH<sub>2</sub>-.

19. The formulation of claim 15, wherein the gelling catalyst comprises N,N,N'',N''-tetramethyldipropylenetriamine.

5 20. The formulation of claim 15, wherein the gelling catalyst comprises 3-dimethylaminopropylamine.

21. The formulation of claim 15, wherein the gelling catalyst comprises N,N-bis(3-dimethylaminopropyl)-1,3-propanediamine.

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22. The formulation of claim 15, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-2-hydroxyethylbis(aminoethyl) ether.

15 23. The formulation of claim 22, wherein the gelling catalyst comprises N,N,N'',N''-tetramethyldipropylenetriamine.

24. The formulation of claim 22, wherein the gelling catalyst comprises 3-dimethylaminopropylamine.

20 25. The formulation of claim 22, wherein the gelling catalyst comprises N,N-bis(3-dimethylaminopropyl)-1,3-propanediamine.

26. The formulation of claim 15, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-3-aminopropylbis(aminoethyl) ether.

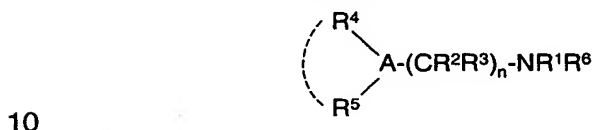
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27. The formulation of claim 15, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-3-ureidopropylbis(aminoethyl) ether.

28. The formulation of claim 15, further comprising a carboxylic acid that forms a salt with one or both of the gelling catalyst and the blowing catalyst.

29. A polyurethane foam comprising a product of a reaction between a polyol  
5 and a polyisocyanate, the reaction taking place in the presence of water and a catalyst composition comprising:

1) a gelling catalyst represented by the general formula:



in which:

A represents CH or N,

R<sup>1</sup> represents hydrogen or the group  $\begin{array}{c} \text{R}^4 \\ \diagdown \\ \text{---} \text{A} \text{---} (\text{CR}^2\text{R}^3)_n \text{---} \\ \diagup \\ \text{R}^5 \end{array}$ ,

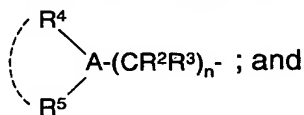
n represents an integer between 1 and 3, inclusive,

15 R<sup>2</sup> and R<sup>3</sup> each represent hydrogen or a C1-C6 alkyl group, and

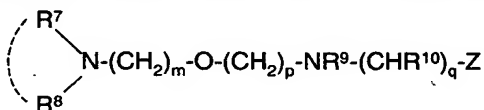
R<sup>6</sup> represents H or 3-aminopropyl, provided that:

when A is N, R<sup>4</sup> and R<sup>5</sup> each represents a C1-C6 alkyl group or together represent a C2-C5 alkylene group which may contain a ring amine moiety -NR-, where R is hydrogen, a C1-C4 alkyl group, or the group  $\begin{array}{c} \text{R}^4 \\ \diagdown \\ \text{---} \text{A} \text{---} (\text{CR}^2\text{R}^3)_n \text{---} \\ \diagup \\ \text{R}^5 \end{array}$ ; and

20 when A is CH, R<sup>4</sup> and R<sup>5</sup> together represent a C2-C5 alkylene group containing a ring amine moiety -NR-, where R is a C1-C4 alkyl group or the group



25 2) a blowing catalyst according to the general formula:



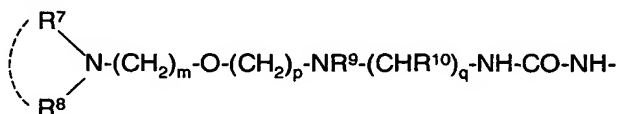
wherein:

$R^7$ ,  $R^8$ , and  $R^9$  each independently represents a C1-C4 alkyl group;

$R^{10}$  represents H, a C1-C4 alkyl group, a C6-C20 aryl group, or a C6-C20 aralkyl group;

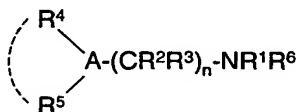
m, p, and q each independently represents an integer between 1 and 4, inclusive; and Z

5 represents -OH, -NH<sub>2</sub>, -NH-CO-NH<sub>2</sub>, or



30. A method of making a polyurethane foam, the method comprising mixing  
10 together a polyol, a polyisocyanate, water, and a catalyst composition comprising:

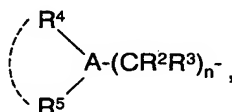
1) a gelling catalyst represented by the general formula:



15 in which:

A represents CH or N,

$R^1$  represents hydrogen or the group

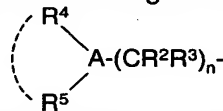


n represents an integer between 1 and 3, inclusive,

$R^2$  and  $R^3$  each represent hydrogen or a C1-C6 alkyl group, and

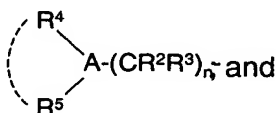
20  $R^6$  represents H or 3-aminopropyl, provided that:

when A is N,  $R^4$  and  $R^5$  each represents a C1-C6 alkyl group or together represent a C2-C5 alkylene group which may contain a ring amine moiety -NR-, where R is hydrogen, a C1-C4 alkyl group, or the group

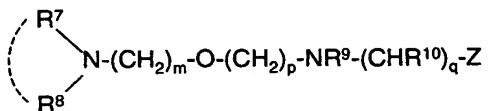


; and

when A is CH,  $R^4$  and  $R^5$  together represent a C2-C5 alkylene group containing a  
25 ring amine moiety -NR-, where R is a C1-C4 alkyl group or the group



2) a blowing catalyst according to the general formula:

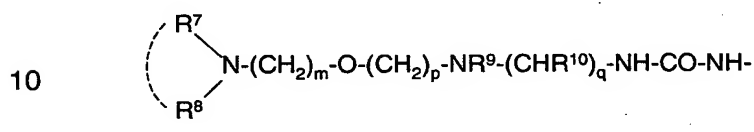


wherein:

5  $\text{R}^7$ ,  $\text{R}^8$ , and  $\text{R}^9$  each independently represents a C1-C4 alkyl group;

$\text{R}^{10}$  represents H, a C1-C4 alkyl group, a C6-C20 aryl group, or a C6-C20 aralkyl group;

$m$ ,  $p$ , and  $q$  each independently represents an integer between 1 and 4, inclusive; and  $Z$  represents -OH, -NH<sub>2</sub>, -NH-CO-NH<sub>2</sub>, or



31. The method of claim 30, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-2-hydroxyethylbis(aminoethyl) ether.

15 32. The method of claim 30, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-3-aminopropylbis(aminoethyl) ether.

33. The method of claim 30, wherein the blowing catalyst comprises N,N,N'-trimethyl-N'-3-ureidopropylbis(aminoethyl) ether.

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34. The method of claim 30, wherein the catalyst composition further comprises a carboxylic acid that forms a salt with one or both of the gelling catalyst and the blowing catalyst.

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